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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/681,497

Applicant(s)

BALES, STEPHEN G.

Examiner

MATTHEW J. DANIELS

Art Unit

1791

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-12 and 14-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-12 and 14-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date 5/30/08
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

I. Claim 17 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The color additive does not appear to be disclosed by the specification. While the other claimed components are each recited by the specification (page 5), the particular composition (polyethylene + lignocellulosic + coupling agent + color additive + additional component) does not appear to be specifically recited.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3-5, 10, and 16 are rejected under 35 USC 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as being obvious over Chow (USPN 5130352). **As to**

Claims 1 and 3, Chow teaches incorporating an amount of boron containing material (boric acid, 4:38-45) in quantities which overlap with the claimed amount, used in a composite product containing lignocellulosic material (4:13) and thermoplastic (4:5-11). In the event that it is ultimately determined that there is insufficient specificity to anticipate the claimed range, Chow teaches that the boric acid provides a particular result of suppression of colour-darkening and odour suppression, and therefore would have been a result effective variable that one would optimize to arrive at the claimed amount. **As to Claim 4**, see wood 6:15. **As to Claim 5**, see polyethylene, 4:5. **As to Claim 10**, see 4:38-45.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. In view of the multiple species claimed (zinc borate, boric acid, colemanite, different polymeric materials) and the differing scope of Claims 1 and 16, multiple rejections were required.
4. **Claims 1, 3-6, 8-12, and 14**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Aida (USPN 5221781) in view of Lloyd (USPN 6368529). **As to Claim 1**, Aida teaches a method for forming lignocellulosic thermoplastic composite products comprising incorporating

an amount of boron-containing fungicide prior to forming the composite product (3:39-55, 6:18-21, 6:62-7:20) and a variety of inorganic fillers (cols. 5-6).

Lloyd teaches calcium borate (Abstract), which is used interchangeably and as a substitute for zinc borate and acts as a filler. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Aida because (1) Lloyd teaches that an additional advantage of producing products with calcium borate in place of conventionally used zinc borate is that the calcium borates (a) have much better flow properties, making them easier to store and handle in processing equipment (9:1-5) and (b) cause less premature wear and failure (1:52-55), and (c) are less toxic than the zinc borates, or (2) Aida suggests a variety of fillers (cols. 5-6), and Lloyd provides an inorganic colemanite filler that would provide the additional benefit that it would resist pests and fungi.

As to Claim 3, Aida teaches the following ranges:

100 parts resin (6:24-25)

5-200 parts organic fillers including wood powder (6:19-25)

5-200 parts of compounds including zinc borate (7:12-15, 6:67)

Aida lacks sufficient specificity to anticipate the claimed range. However, the claimed range would have been prima facie obvious over Aida's teachings to use the materials in combinations of two or more (7:4-5 and 7:33-34) and to adjust these ranges (7:12-28), making the amount of zinc borate a result-effective variable. Values within these ranges, such as 100 parts resin, 100 parts organic fillers, and 7 parts zinc borate, would fall within the claimed zinc borate range (7 parts zinc borate amounts to 3.4% by weight). **As to Claims 4 and 5**, Aida teaches at least wood and polyethylene (6:19 and 3:39-45). **As to Claim 6**, Aida is silent to

calcium borate. However, Lloyd teaches calcium borate (Abstract). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Aida because Lloyd teaches that an additional advantage of producing products with calcium borate in place of conventionally used zinc borate is that the calcium borates (a) have much better flow properties, making them easier to store and handle in processing equipment (9:1-5) and (b) cause less premature wear and failure (1:52-55), and (c) are less toxic than the zinc borates. **As to Claims 8, 9, 11, and 12**, Lloyd teaches at least calcium polytriborate (3:39) that is either natural or synthetic (3:39-41), and colemanite (3:30-45, especially 3:41). **As to Claim 10**, Lloyd teaches that "Borates such as boric acid...are well accepted as wood preservatives." (1:32-36) Therefore, Lloyd teaches that boric acid is a conventional wood preservative, and would have been obvious as a material to be also included in the Aida process. **As to Claim 14**, Aida teaches at least zinc borate and wood (6:67 and 6:19).

5. **Claims 1, 3-5, 6, 8, 9, 11, 12, and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Touval (USPN 3926883) in view of Pelikan (USPN 4104207). **As to Claim 1**, Touval teaches forming a thermoplastic product which comprises incorporating an amount of boron containing material which inherently acts as a fungicide in an amount between 2-12% of the article (7:30-60). Touval appears to be silent to the lignocellulosic material, however, such composites are conventional and well known to those skilled in the art. See Pelikan (Abstract, lines 1-3, 6:19, 6:39-53).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Pelikan, the method comprising incorporation of

lignocellulosic filler, into that of Touval because (1) doing so would provide reinforcement (increased strength) and a foaming agent (decreased weight), and because this technique (lignocellulose as a reinforcement or carrier for blowing agent), is a conventional technique in the art that one would have found it obvious to apply to the Touval method, and (2) Touval suggests foams (Example 5), and Pelikan provides the ability to foam by using the lignocellulose reinforcement as a carrier for a foaming agent.

As to Claims 3-5, 6, 8, 9, 11, 12, and 15, Touval teaches polyvinyl chloride (8:18) which is a thermoplastic, and colemanite (Table 1, column 7, colemanite is a naturally occurring calcium borate) used in an amount of 3-5% (Table 1, samples 7-8), which would inherently provide the claimed degree of resistance to visual impairment. Additionally, the amount of colemanite is clearly a result effective variable that one would optimize to arrive at the claimed range which is not substantially different than the amounts disclosed by Touval in Col. 7. Pelikan clearly suggests pine wood as a lignocellulosic material (6:66).

6. **Claims 1, 3-6, 8-12, 15, and 16-17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelikan (USPN 4104207) in view of Lloyd (USPN 6368529). **As to Claims 1 and 16,** Pelikan teaches a method for forming composite products which incorporate a thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), and a blowing agent (7:23-24, bubbles). Claim 1 of the Pelikan suggests that it would have been obvious to provide a composite consisting of only these components. Although silent to the borate materials, Lloyd teaches the claimed amount (4%) of calcium borate in the form of colemanite incorporated into a composite material (3:45-62).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Pelikan because (1) Pelikan provides a material which includes wood or other lignocellulosic materials and Lloyd teaches that calcium borate may be used as a pesticide against fungi and insects that destroy wood, thus it would have been obvious to apply the improvement of Lloyd to the material of Pelikan, with the expected result that the same fungi and insect resistance would be provided to the Pelikan material, and/or (2) the calcium borate of Lloyd would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31). **As to Claims 3 and 6, 8, 9, 11, and 12**, Lloyd teaches the claimed amount (3:45-62) of naturally occurring colemanite (calcium borate). **As to Claim 10**, Lloyd teaches that "Borates such as boric acid...are well accepted as wood preservatives." (1:32-36) Therefore, Lloyd teaches that boric acid is a conventional wood preservative, and would have been obvious as a material to be also included in the Pelikan process. **As to Claims 4, 5, 15**, Pelikan clearly suggests pine wood as a lignocellulosic material (6:66) and PVC as a thermoplastic (6:19). **As to Claim 17**, Pelikan teaches a method for forming composite products which incorporate a thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), a color additive (6:27-28), and softeners or stabilizers (6:22) which may be considered to be coupling agents since they would help the polymer conform and bond to the lignocellulose, and a lubricant (water, 6:48). Although Pelikan is silent to the borate materials, Lloyd teaches the claimed amount (4%) of calcium borate in the form of colemanite incorporated into a composite material (3:45-62).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Pelikan because (1) Pelikan

provides a material which includes wood or other lignocellulosic materials and Lloyd teaches that calcium borate may be used as a pesticide against fungi and insects that destroy wood, thus it would have been obvious to apply the improvement of Lloyd to the material of Pelikan, with the expected result that the same fungi and insect resistance would be provided to the Pelikan material, and/or (2) the calcium borate of Lloyd would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31).

7. **Claims 1, 3-6, 15, and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelikan (USPN 4104207) in view of Borogard ZB (of record, 3/20/08 IDS). While it is noted that the IDS appears to cite the Borogard ZB sheet as having been published July 26, 2003, the document states on its face that it was "Accepted" on July 26, 1993. The 2003 citation in the IDS is believed to be a typographical error. **As to Claims 1 and 16**, Pelikan teaches a method for forming composite products which incorporate a thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), and a blowing agent (7:23-24, bubbles). Claim 1 of the Pelikan suggests that it would have been obvious to provide a composite consisting of only these components. Although silent to the zinc borate, Borogard ZB teaches incorporation of zinc borate at a loading of 3-20 parts or 0.5 to 8% for use as a biocide and fire retardant (phrase below title, also Plastic and Rubber Products and Wood Composite Materials section on Page 2 of 3). This quantity reads on the claimed amount of zinc borate.

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Borogard ZB into that of Pelikan because (1) Pelikan provides a PVC material incorporating wood, and Borogard ZB expressly suggests the zinc

borate for use with PVC, plastics, and wood composite materials, and/or (2) the calcium borate of Borogard ZB would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31). **As to Claims 3, 11, 14**, Borogard ZB teaches zinc borate and suggests that it be incorporated into plastics and wood composites in the claimed amount (Page 2 of 3). **As to Claims 4, 5, 15**, Pelikan clearly suggests pine wood as a lignocellulosic material (6:66) and PVC as a thermoplastic (6:19).

Response to Arguments

8. Applicant's arguments filed 30 May 2008 have been fully considered but they are not persuasive. The arguments appear to be on the following grounds:

a) (Page 3) Chow's boric acid limits are 0.02%-20% which gives a range of 0.002-12% while the present invention claims only 2-12%. Chow's preferred limits on the amount of boron-containing material lead to a range of 0.09%-0.9% of the composite.

b) (Page 3) The color darkening and odor which transpire if the material is produced at 200 C or above are the result of lignocellulosic degradation. One optimizing the Chow method would be experimenting and optimizing on the wrong result. One optimizing the Chow process would arrive at a conclusion that 0.8% at most as an effective loading, less than the claimed 2%.

Additionally, Table I demonstrates the results of increasing boric acid content with color change caused by temperature degradation. Increased content was found to decrease color darkening at all press times at the 250 C level, but at the 220 C level, just the opposite occurred.

c) (Pages 4-5) Applicants submit that the arguments presented in the 3-20-2008 response traverse the rejection. Additionally, Lloyd teaches boric acid, but then states that boric acid is soluble in water and results in poor mechanical strength.

d) Although the Borogard ZB reference states that zinc borate could be used to control mold fungi, the prior art proved that the material was ineffective at the task at typical use levels. The Borogard ZB label does not claim mold fungi effectiveness in wood composites and the fungi listed on the label are decay (rot fungi). The prior art took years to recognize the effectiveness of zinc borate as an effective mold suppression chemical, which is an indication of unexpected results.

e) Koskiniemi validates the assertion that colemanite does not effectively suppress mold growth. Touval shows that colemanite only works with stannic oxide, and it takes 8% loading to be effective.

f) Touval teaches that non-halogenated polyethylene requires a range of 4-25% flame retardants, but that colemanite is less effective in the lower part of this range. Even when augmented with other materials, 8% colemanite is required.

g) Pelikan uses a lignocellulosic material as a carrier gas. The plastic is 75% of the composite, while the current invention is 25%-75%. Pelikan also uses a particular particle size. But for the composites of this invention, these large particles are unacceptable.

h) (page 9) There is no suggestion of wood preservation or the use of borates in Pelikan.

9. Reponse:

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a) The claimed ranges overlap with the exception that Chow discloses that the range can be extended to nearly 0%. However, the substantial overlap in this case is evidence of obviousness despite Chow's teaching that the material may also be beneficially used at lower concentrations.

With respect to the preferred range, it is submitted that the reference is valid for all that it teaches, including non-preferred embodiments. Since the broad embodiments of Chow would fall within the claimed amounts, the rejection is maintained.

b) It is believed to be the case that the optimized quantities are still within the broad embodiments suggested by Chow, thus an optimization process would encompass the claimed range. Table I of Chow has been reconsidered, but it is unclear how the trends described contradict the composition teachings of Chow.

c) The response to these arguments is incorporated by reference herein. What Lloyd appears to teach is that the use of the materials such as boric acid is conventional in the art, but there are limitations. The argument does not appear to suggest a specific resolution to the problem disclosed by Lloyd, but suggests that this teaching is sufficient to suggest the undesirable nature of the boric acid. However, it must be first recognized that Lloyd suggests that *the claimed compositions have been tried or attempted*. In doing so, it would have been implicit that the same results achieved by this application were already found in the Lloyd process.

d) The label (page 2) does appear to suggest the use of the zinc borate material as a preservative in a wood composite material, contrary to Applicant's argument. In response to applicant's argument that the prior art shows ineffectiveness in the range suggested by the Borogard ZB label, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the

differences would otherwise be obvious. The fact that an additional benefit is recognized from following the suggestions of the prior art also does not establish the basis for patentability.

e) Note that Touval teaches control samples (Table 1, samples 8-10) which contain a range of Colemanite believed to be below the asserted 8%, and do not require the stannic oxide, as asserted in the arguments.

f) As a technical matter, Touval suggests that the concentration may include 0.5-25% phr flame retardants (2:26), which is limited to 4-25% for some compositions. The “control” examples (8-10 in Table I) do not appear to have been considered, but would appear to fall within the claimed subject matter. Additionally, Examples 19-26 appear to contradict the argument that at least 8% colemanite is required. Several examples show 2-5% colemanite in combination with stannic oxide.

g) No particular amount of plastic or lignocellulose or particle size are claimed.

h) Because wood preservation would have been desirable in the art even absent any specific suggestion, one would have found motivation to make the combination.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
10/27/08

